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NOTES ON GREGARINES *

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This paper includes the description of a single new species of gregarine, of the genus *Gregarina*, taken from a coleopteran host and notes on two species discovered by Leidy around the year 1850, belonging to the genus *Stenophora* and found in myriapods.

STENOPHORA LARVATA (Leidy) Ellis (Fig. 1, A and B)

Host: *Spirobolus spinigerus* Wood [*Spirobolus marginatus* (Say); *Julus marginatus* Say].

Location: Urbana, Ill., August, 1920.

Habitat: Intestine.

The present species was found by Leidy in 1849, and is interesting because it was the first of the long list of gregarines which he observed. He gave to it the name *Gregarina larvata* for "*Gregarina* is probably the larva condition of some more perfect animal, but . . . I have not been able to detect any form which could be derivable from it. . . . In the state in which *Gregarina* is found, it would probably hold a rank between the *Trematoda* and *Trichina*, the lowest of the Nematodea."

The species has received many other names, being discussed by numerous subsequent workers. Labbé (1899) placed it in his newly-created genus *Stenophora* and Ellis (1913) returned to it the original species name. A detailed discussion of the species with references to the literature will be found in Watson (1916:49-51). In this paper I stated "*Stenophora larvata* has not been found since Leidy's discovery of the species and its validity must be questioned until his work is substantiated by rediscovery of this parasite."

The present notes, then, reestablish the existence of the species, although they are confined to the mature vegetative stage only. I have opened numerous millipeds in different years but only in one instance succeeded in finding this parasite and then but few individuals were present. The longest specimen reached 550μ with a maximum width of 50μ and ratios of Length protomerite: Total length:: 1 : 22 and Width protomerite : Width deutomerite :: 1 : 2.5; Leidy's record stands Maximum length 800μ , maximum width 23μ ; ratio LP : TL:: 1 : 20; WP : WD :: 1 : 2.

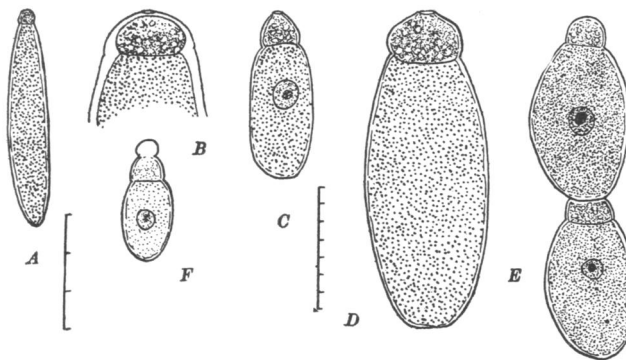
The protomerite is comparatively small, broadly dome-shaped, almost flat on top, and with a minute papilla at the apex. It is but slightly constricted at the septum where the outer layer (epicyte) is

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considerably thickened. Protoplasmic granules in the protomerite are much coarser, more sparsely scattered, and more refringent than those in the deutomerite.

The deutomerite is very large in comparison with the protomerite, elongate-cylindrical and broadly rounded posteriorly. It possesses considerable motility, a characteristic possessed by many of the Stenophoridae. The protomerite, however, is rigid. The endocyte is very dense and homogeneous, and is black in transmitted light. The nucleus is almost completely obscured in life, and is small and spherical.

The species, unlike many members of the genus, is very susceptible to a water medium, ceasing movements almost immediately. The protoplasm is collected in masses within five minutes although the epicyte does not rupture, practically the original shape being retained after half an hour on the slide. Many species in the genus remain alive and



EXPLANATION OF FIGURE 1

A, B, *Stenophora larvata* (Leidy) Ellis.

C, D, *Stenophora polydesmi* (Lankester) Watson.

E, F, *Gregarina anthici* nov. spec. (*this paper*).

The line under A represents 0.3 mm.; that under C 0.07 mm., the same magnification being used for B, C, D, E and F.

motile for this length of time. No cysts or sporozoites were found. One-half the infected intestine was reserved for sectioning, but no further evidence of parasitism was found.

A few representative measurements in microns are appended here:

| | a | b | c |
|---------------------------|--------|--------|-------|
| Length protomerite | 40 | 40 | 20 |
| Length deutomerite | 510 | 490 | 420 |
| Total length sporont..... | 550 | 530 | 440 |
| Width protomerite | 50 | 60 | 50 |
| Width deutomerite | 110 | 130 | 110 |
| Ratio LP:TL | 1:13.7 | 1:13.3 | 1:22 |
| Ratio WP:WD | 1:2.5 | 1:2.1 | 1:2.5 |

STENOPHORA POLYDESMI (Lankester) Watson (Fig. 1, C, D)

Host: *Fontaria virginensis* (Drury) [*Polydesmus virginensis* Drury].

Location: Urbana, Ill., August, 1920.

Habitat: Intestine.

This species also was discovered by Leidy (1853), and its identity established by him. It has since been found and described by Crawley, in 1903. Some confusion concerning its nomenclature has arisen, and a discussion with synonyms will be found in Watson (1916: 51-2). It only remains to add a new habitat, a table of dimensions including those of the cyst, and minor characteristics of the vegetative stage.

The specimens found are shorter than those recorded by both Leidy and Crawley (900μ and 400μ respectively) but are undoubtedly not fully mature. Cysts were found measuring 600μ in diameter, which indicates much larger sporonts than any of the numerous ones I saw.

The protomerite is coarsely granular, with a dozen or more large angular transparent granules resembling grains of sand collected near the septum. There is a slight papilla at the apex with a grouping of protoplasmic granules to resemble a pore leading back into the protomerite, and which has been so frequently observed by Léger for this genus. I am unable to explain the latter phenomenon. The papilla is probably a rudimentary structure, possessed by most members of this genus.

The endoplasm of the deutomerite is not dense as in many of the species of the genus, and Brownian movement can be seen readily along the periphery. The nucleus is clearly visible *in vivo* and is small and spherical with one karyosome. One of Leidy's figures represents an ellipsoidal nucleus but at a place where contraction of the deutomerite is evident; his other figures represent it as spherical.

Measurements in microns of a few specimens follow:

| | a | b | c | d |
|---------------------------|-----|-------|-----|-------|
| Length protomerite | 30 | 30 | 20 | 20 |
| Length deutomerite | 150 | 145 | 80 | 70 |
| Total length sporont..... | 180 | 175 | 100 | 90 |
| Width protomerite | 40 | 40 | 20 | 27 |
| Width deutomerite | 80 | 82 | 40 | 50 |
| Ratio LP:TL | 1:6 | 1:5.8 | 1:5 | 1:4.5 |
| Ratio WP:WD | 1:2 | 1:2 | 1:2 | 1:1.9 |
| Diameter cyst | 600 | 600 | 600 | |

GREGARINA ANTHICI nov. spec. (Fig. 1, E and F)

Host: *Anthicus* sp. fam. Anthicidae. (Det. Messrs. Malloch and Alexander.)

Location: Urbana, Ill., June, 1920.

Habitat: Intestine.

The host of this parasite is a minute beetle which frequently flew into my study through the meshes of the screen. Several hundred parasites were often found in an intestine, many of them associated in pairs. No anomalies were seen.

The body is obese, the deutomerite egg-shaped, widest at or just anterior to the middle and well-rounded posteriorly. The protomerite varies from a rather high to a somewhat flattened dome. There is no constriction at the septum in adults.

The protomerite is almost transparent, filled with coarse granules, while the deutomerite is homogeneous and finely granular, in adult specimens very dense and black except at the edges. The nucleus is faintly visible in life. In young specimens the deutomerite is tan-colored and not dense. The nucleus is spherical and contains one large karyosome.

Live trophozoites were seen through the intestine walls and were attached by means of a large simple knob typical of the genus *Gregarina*. Similar epimerited specimens were found free in the intestine. No cysts were found.

A few measurements of typical specimens in microns follow:

| | Primate | | | Satellite | |
|-------------------------------|---------|-----|-----|-----------|-------|
| | a | b | c | a | b |
| Length protomerite | 20 | 15 | 20 | 19 | 15 |
| Length deutomerite | 90 | 75 | 80 | 79 | 55 |
| Width protomerite | 23 | 30 | 30 | 31 | 22 |
| Width deutomerite | 67 | 60 | 60 | 59 | 35 |
| Total length sporont..... | 110 | 90 | 100 | 98 | 70 |
| Total length association..... | 208 | 160 | | | |
| Ratio LP:TL | 1:5.5 | 1:6 | 1:5 | 1:5.1 | 1:4.6 |
| Ratio WP:WD | 1:2.8 | 1:2 | 1:2 | 1:1.9 | 1:1.5 |
| Diameter nucleus | 18 | 20 | | 17 | |

LITERATURE CITED

- Watson, M. E. 1916.—Studies on Gregarines, III. Biol. Monogr., 2:211-468. 15 pl.